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ABSTRACT

Designed as a specialized play area for physically handicapped preschool children with perceptual deficits, The Magruder Environmental Therapy Complex (ETC) is described as a means to create an environment in which these children could function freely. Pictures are used to show children using the equipment and the architectural aspects of construction. A brief summary, the problem defined, the goal of ETC, the basic perceptual motor experiences of ETC, principal features of ETC and physical problems, testing plans designed to evaluate the effects of ETC, and early observations by teachers, therapists and aides indicating the benefits of the free, unstructured play area are detailed. (WW)

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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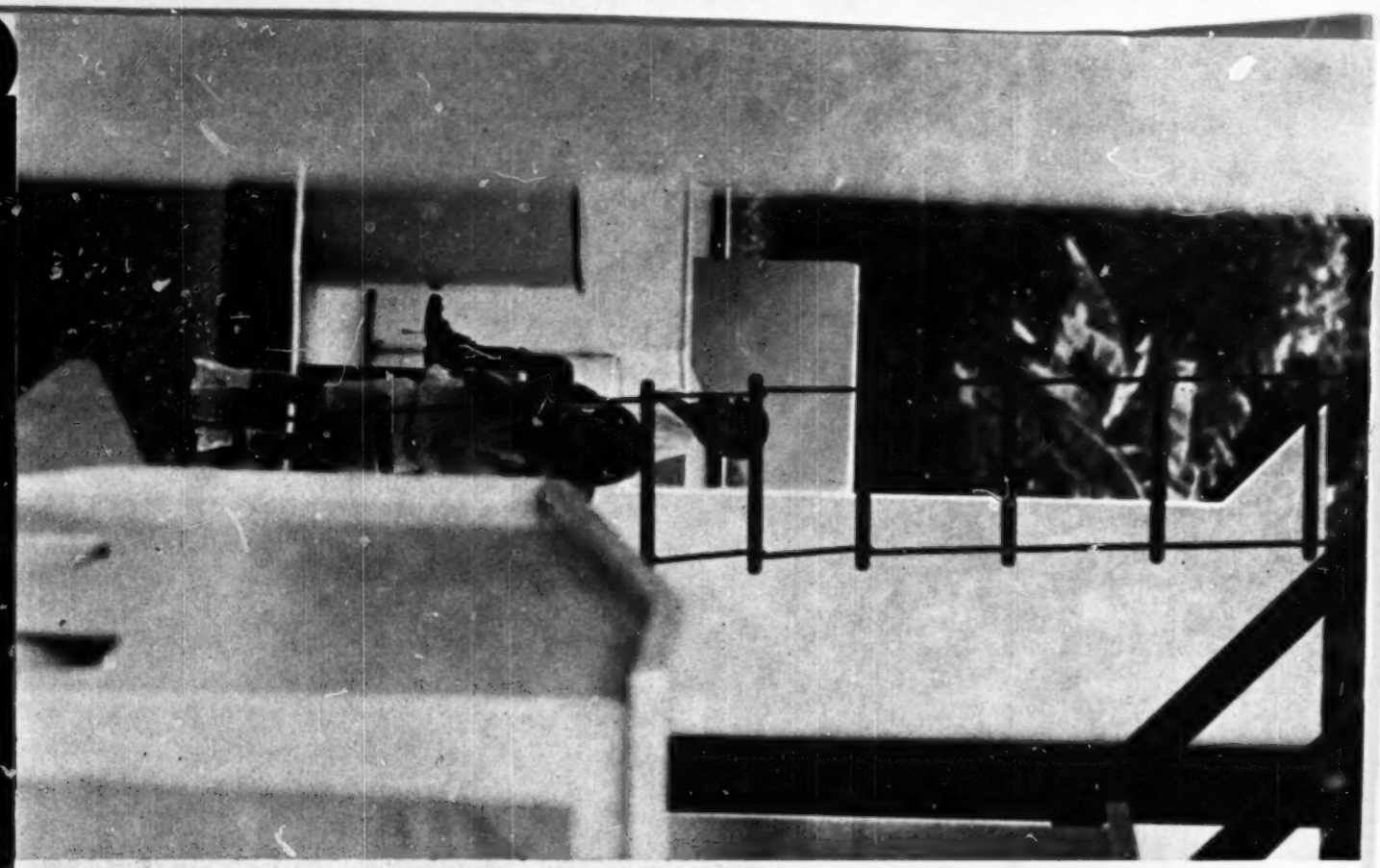
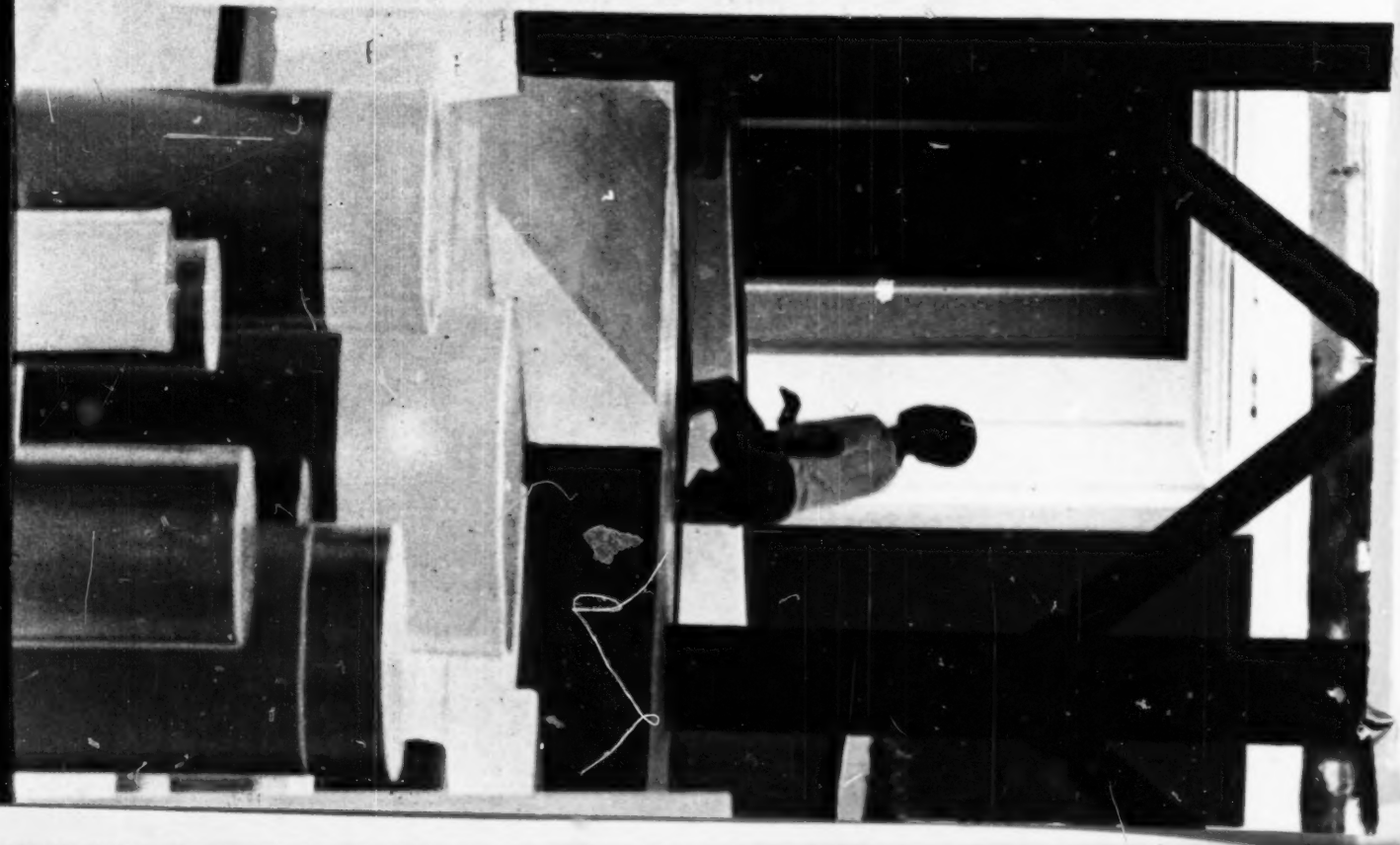
AN ADAPTIVE PLAYGROUND FOR PHYSICALLY DISABLED CHILDREN WITH PERCEPTUAL DEFICITS

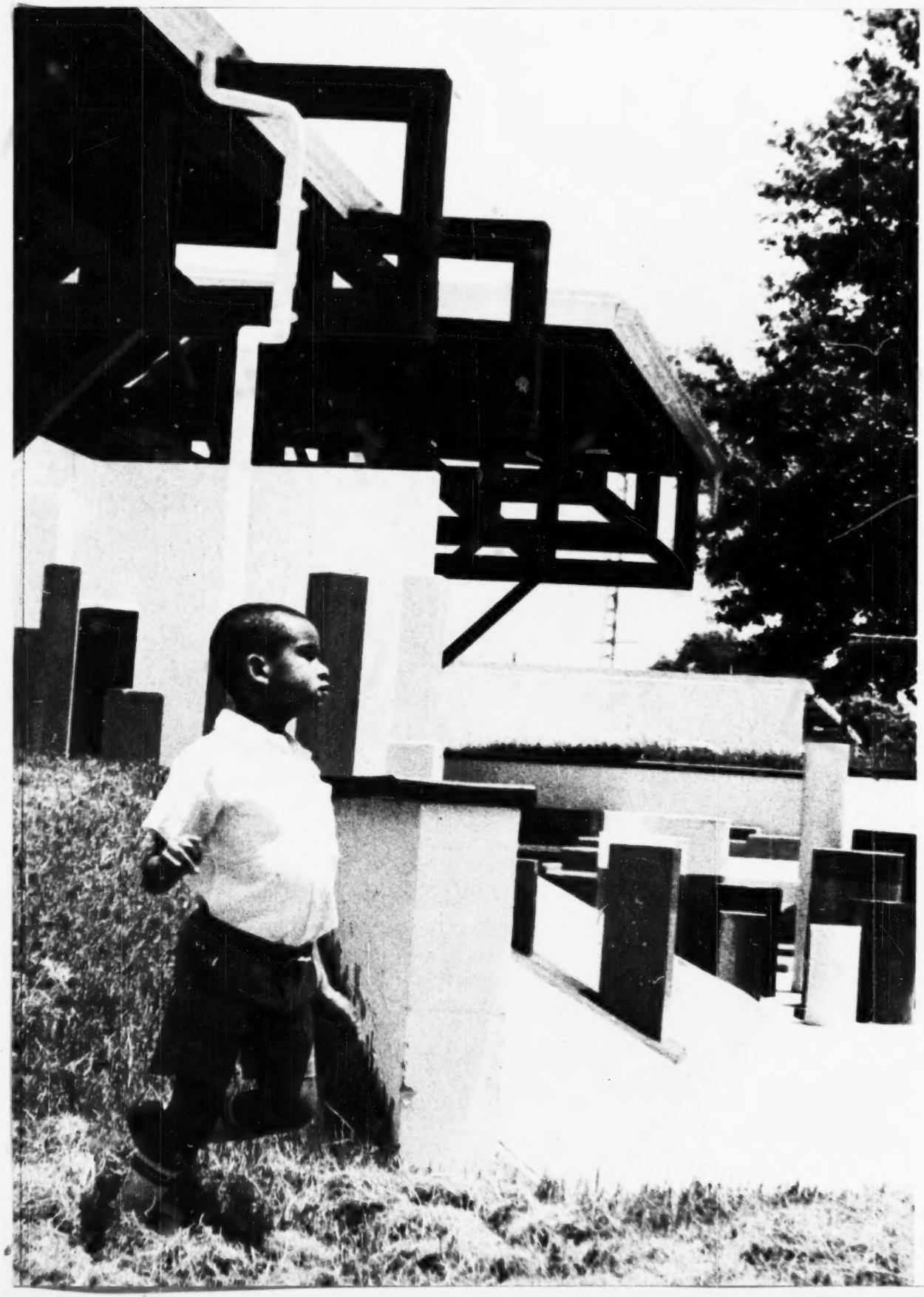
THE MAGRUDER ENVIRONMENTAL THERAPY COMPLEX

ORANGE COUNTY
BOARD OF PUBLIC INSTRUCTION
James M. Higginbotham, Superintendent
FORREST PARK SCHOOL
1600 Silver Star Road
Orlando, Florida

ONE SITE







Forrest Park School

Forrest Park School was organized in 1948, by the Orange County School Board in cooperation with the Junior League and Crippled Children's Society.

The Orange County Board of Public Instruction is administratively responsible for the operation of Forrest Park School. It provides funds for salaries of professional personnel as it would for any regular elementary school, and it provides for necessary maintenance.

The Forrest Park School Board which is composed of representatives of many civic and fraternal organizations, administers all charitable funds donated to the school. They also pay salaries of maids, aids, and other personnel who cannot be paid by the Orange County Board. Most of the money for salaries comes from Crippled Children's Society of Orange County, a member of the United Appeal of Orange County.

The Forrest Park Medical Board is Composed of physicians from Orange County who are responsible for the medical care of children at the school. Clinics are held every two weeks and therapy orders or suggestions to a child's private physician are issued.

We believe that only through a closely interwoven relationship of medical and educational services and parent counseling, can we best help the child with a handicap — to achieve the following goals;

1. The best education he is able to attain.
2. Maximum physical independence.
3. Emotional stability built upon his and his family's realistic knowledge and acceptance of his abilities and disabilities.
4. A personality conducive to his acceptance by society.
5. An awareness of his God and of his God-given personal worth and dignity.

I. In Brief

The Magruder Environmental Therapy Complex is a specialized play area for the handicapped preschool children of Forrest Park School in Orange County, Florida. The project was proposed because of increased awareness of an unmet need in the area of motor perception for preschool, physically handicapped children. Conventional play equipment and normal life experiences were largely inaccessible to the physically limited child. The answer seemed to be in creating an environment with motivation through play in which these children could function freely and acquire experience akin to that of other children. It is thought that such motor perception experience is basic to academic learning. An extensive testing program is included in the project to measure its results in the area of motor perception skills as a basis for abstract thinking necessary to formal school learning. Proof that it is possible to improve the handicapped child's learning ability by providing a fuller range of preschool perceptual experience will be a "breakthrough" for educating not only these children but similarly handicapped children throughout the nation. Other types of exceptional children whose motor experiences have been limited by physical, mental, emotional, social or cultural deprivation may also benefit from this type of preschool experience.

The project is funded by a Federal Grant under Title VI of the Elementary and Secondary Education Amendment of 1966. It is designated as Federal Project 68012: "Adaptive Playground for Pre-school Physically Disabled Children with Perceptual Deficits." The first funds were appropriated in the early spring of 1968, and the consultants began work on the project at that time. Supplementary funds were received in fall, 1968 and 1969 to continue the work.

II. The Problem

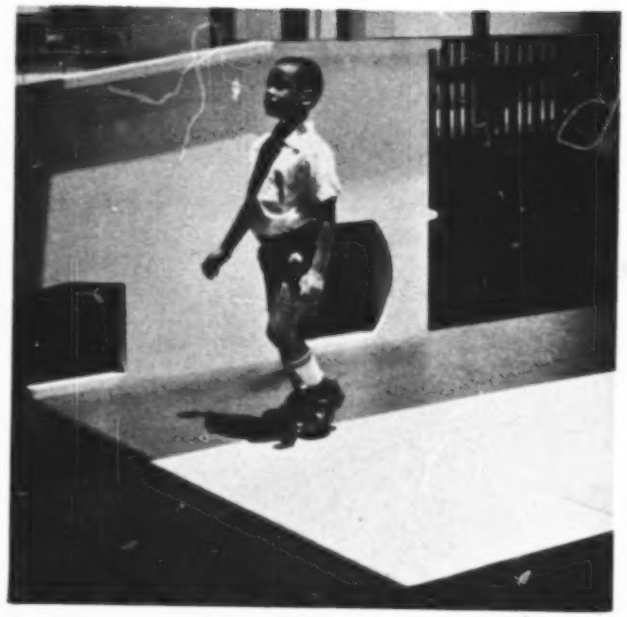
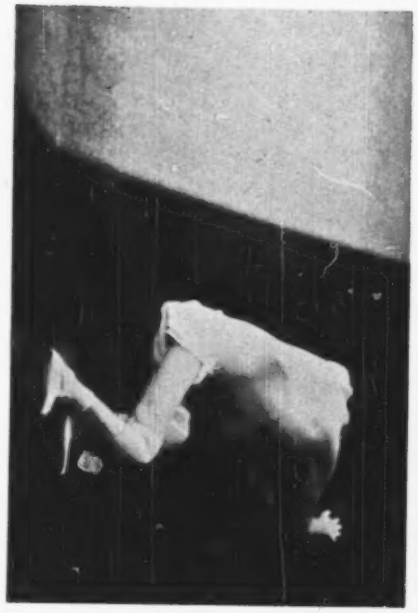
Normally, a child's knowledge of himself and his surroundings begins with exploration of his own body. This exploration begins in the crib, as the child discovers his hands, feet and mouth and experiments with them, discovering that each has specific functions which he can control. His body then becomes his tool for exploring his environment. In reaching for an object which attracts him, the infant discovers space and distance; in grasping an object, he discovers texture, weight and bulk. His increasing skill and confidence in manipulating his own body and the objects of his environment are termed **motor development.** The levels of motor development have been sufficiently defined to make it possible to test individual children and measure their progress against established norms. The child's recollection and awareness of his growing skills are called **motor perception.**

From the very beginning, however, a physically handicapped child encounters barriers to his exploration. His inability to explore his body and his surroundings impairs his perception of them. If he cannot control the movement of his hands and feet, he will be unable to discover their functions; he may even remain unaware that they are his. If his grasping ability does not develop beyond the most rudimentary level, he will be unable to fully explore any object in his hand, either with his eyes, with his mouth, or by a refined touch of fingertips. Thus a handicapped child may fail to reach the common levels of motor development and his motor perception may show deficiencies due to lack of experience.

Learning depends on perception; if the flow of sensory experience is blocked or slowed because of an impaired motor system, then mental development cannot proceed at a normal rate. In school a disabled child may have difficulty in grasping abstractions basic to academic progress. Such difficulty is often assumed to be due to low I.Q. or even retardation. Actually, these learning problems may be the result of a lack of perceptual experience due to physical deficiencies.

As a child passes out of infancy, play becomes a major source of experience. In playing he learns more about his body and its place in his environment; play also provides the repetition needed to refine and control motor skills. Thus play is crucial to the development of motor perception.

The original playground at Forrest Park School was much like any normal nursery or kindergarten facility. There were swings with nursery seats, a slide, a sand box, tricycles, wagons, and various small educational toys. This equipment is typical of play facilities available to handicapped children in most schools. Both because of corrective braces or wheelchairs and because of the physical danger involved in free play on such equipment, the children at Forrest Park could have no spontaneous play on their playground. Each activity had to be closely governed by adults. A child could be placed in a swing and swung; he could be held on a horse or pulled in a wagon; he could be guided down a slide. These are all passive play experiences. Often the child confined to a wheelchair could do nothing but look on. At best, this kind of play is of limited value to a handicapped child; at worst, it can lead to frustration or to stifling of the child's normal enthusiasm for play. Equally important, if a child is unable to move freely in play, if he cannot even climb or crawl, much less run and jump, he cannot learn about his body and its relationship to his environment. He lacks information about himself and the world; this information is vital to further learning.

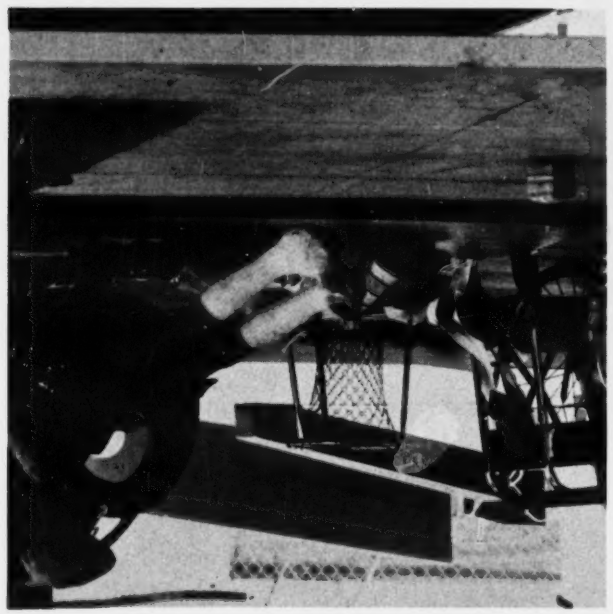
III. The Goal

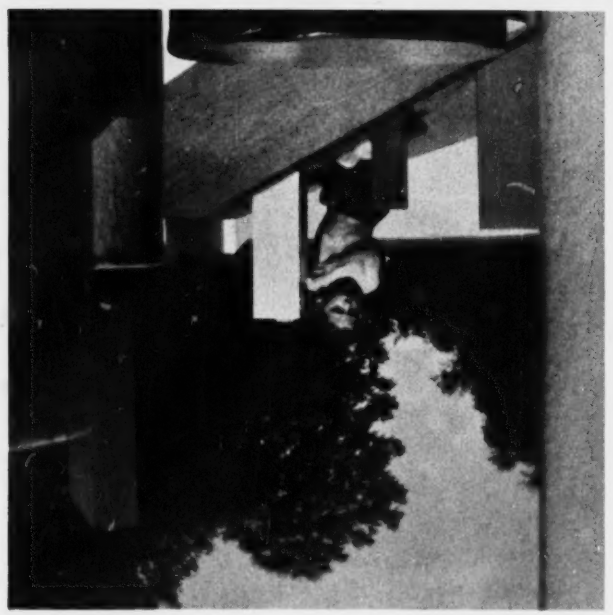
The Magruder Environmental Therapy Complex, ETC, was conceived in response to the problems outlined above. The goal was to provide a play situation in which disabled children could function by themselves, regardless of the extent of their disabilities, and could have motor experiences comparable to those of normal children. By reinforcing therapy training and creating new opportunities for development of motor perception, the hypothesis is the new play environment would give the children a broader range of perceptual experience and thus a fuller and more normal base for academic education.

From an extensive survey of the literature of the field, particularly the work of Newell Kephart and Ray Barsch, a set of desirable perceptual goals essential to the full development of motor perception has been developed:

1. BODY BALANCE — dynamic and static.
2. BODY AWARENESS — self awareness and body parts awareness.
3. LATERALITY — understanding of the body halves, right and left.
4. INTEGRATION OF BODY SIDES — understanding of back and front, up and down, right and left, externally in relation to the body.
5. DIRECTIONALITY — movement in all directions from various planes of the body.
6. SPATIAL RELATIONSHIPS — where one is in space, how much space he occupies.
7. DEPTH PERCEPTION — accessibility of objects up and down in space.
8. LINEARITY — following lines out in space; knowledge of remote spaces.
9. TACTILE AWARENESS — the feel of things.
10. KINESTHETIC AWARENESS — the feel of joints and muscle movement.
11. TEMPORAL AWARENESS — time required to get from one place to another.
12. SPATIAL RELATIONSHIP OF OBJECTS IN SPACE — where one external object is in relationship to another.
13. JUDGEMENT AND DECISION — based on the above; the ability to avoid objects as one moves in space.
14. MOTOR PLANNING — a consolidation of knowledge of how to move efficiently in space.
15. CONCEPTS ABOUT SPACE — the above experiences and the inner knowledge gained from them should bring about increased understanding of abstracts in formal learning.

Normally, children gain these experiences by such activities as rolling down hills, jumping into leaves, snow or hay, hiding under furniture, climbing trees, and freely running and tumbling. The goal of the ETC was to offer handicapped children opportunities to develop the basic perceptual skills by providing equipment specifically designed for that purpose. Unlike the usual therapeutic equipment, however, the playground was to allow the children free, spontaneous and unstructured play. Unhindered by their braces, yet protected by yielding surfaces, the children would be afforded a breadth of experience as similar as possible to that of normal children.





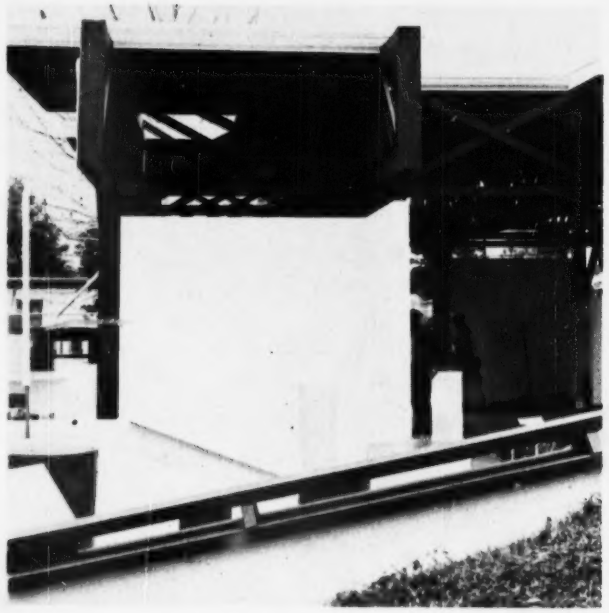
IV. Experiencing the ETC

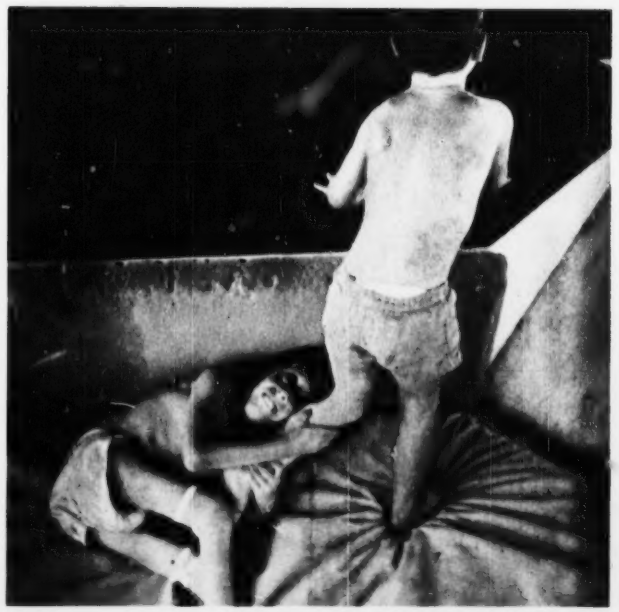
The basic construction of the Magruder Environmental Therapy Complex was completed in April, 1969. Its design represents an effort to overcome the traditional differentiation between physical therapy and playground activity. The basic perceptual motor experiences, usually offered — if at all — in formal clinical therapy, have been translated into environmental elements. In contrast to the ordinary setting for therapy — a flourescent-lighted room, a chaos of wheelchairs, braces, standing bicycles, and other steely objects reminding the child he is there for drudgery and discomfort to be dreaded and endured — the ETC offers an attractive, colorful, exciting atmosphere, stimulating his imagination and making him want to use his muscles, which here are completely free of braces. And in contrast to the usual playground — a slide here, a swing there, separated by unmanageable expanses of asphalt, sawdust or bare ground — the ETC presents a continually flowing series of events and experiences which constitute an environment.

This environment features a variety of stairs, slopes and slides. There are tunnels to crawl through and holes to hide in. A foam-lined pit invites jumping, falling and bouncing. Chalking surfaces, mirrors and bright colors everywhere stimulate the eye. Shapes of every type, stationary and portable, large and small, invites imaginative play. The entire area is a maze of brightly carpeted paths.

What appears to the child as a fantasy world of brightly colored shapes scaled to his size, pleasant to his touch, and tolerant of his limitations is also a series of potential explorations and adventures — and therapeutic exercises. There are no unusable spaces; every inch of the ETC offers a child perceptual stimulation. Movement from place to place is undertaken by a child at his own speed, in his own fashion; he is impelled only by his own desire to reach a goal. Exercise and learning are naturally motivated by the child's desire to move, to explore, to play. The non-representative nature of the objects and the environment as a whole spurs the children to exercise their imagination and creativity as well as their bodies.

The appeal of imagination will be sustained, for the face of the environment will be constantly changing. The ETC is designed to allow change and experimentation by the staff. An example of this is the maze areas. These pieces are heavy enough to provide stable climbing and crawling for the children, yet can be moved by the staff to form a variety of patterns and configurations. In addition, the children themselves can change the environment; among the many flexible features of the ETC is a set of large, interlocking, vinyl - covered, foam letters which are light enough to be moved by the children and which can be fitted together to form large sculptures. This allows the children to safely manipulate large objects in space, a valuable experience usually denied them by their disabilities.





V. Physical Problems of the ETC

The principle contribution of the designer, aside from the actual shaping of the ETC, lay in establishing the concept of environment discussed in the preceding sections.

The Environmental Therapy Complex consists of an area approximately 100' x 100', about one-half of which is covered by a roof truss system. The limits of the interior area are delineated by concrete-block retaining walls capped by 2" x 10" planks which serve as various types of balance beams. Marine plywood shapes are formed up to the wall on the interior and are the principal element of the environment. They slope, change size and shape, form tunnels, steps and slides as they snake around the ETC. Most are covered with exterior carpeting in vivid colors, but some are left hard-surfaced and are painted with bright-colored tractor enamel. Surrounding the man-made forms inside the retaining walls of the ETC are natural, organic forms on the outside. Grass-covered earth mounds containing sand and water curve up to the retaining wall from the surrounding field, reducing the scale from the exterior and partially concealing the interior events.

The overhead roof truss system, is the environment's most flexible aspect. It is a double corded, gang nailed truss system, with the cords separated by a spacer. This spacer allows elements to be slipped between the cords and secured with nailing. Space dividers, rope ladders, scale changing devices, and overhead arm pulls are a few objects which are being supported by the trusses. The trusses with these crossbracing from a 8' x 8' grid which organizes the elements. This spacing is born from an initial 4' x 4' module established in the planning stages at the ground level. The truss system's capabilities should stimulate creative thinking on the part of the therapists; if someone has an idea for a certain activitiy not already provided for, the grid system should adapt itself to a variety of possibilities.

Much of the total interior area of the complex is covered by exterior carpeting. The several carpet colors designate the various general areas of the environment. In addition to the storage and unbracing located at the entrance to the complex, the principle features of the ETC are as follows:

BALANCE BEAM — Proprioceptive information from the body segments as they are pushed and pulled against gravity in an effort to stay on the beam. This equals KINESTHETIC AWARENESS plus DYNAMIC BALANCE.

STEP PROGRESSION — Orientation change from a horizontal to a vertical plane in space, with knowledge of up and down in space with relationship to the self a basis for DEPTH OF HEIGHT.

SHELTERS OR CAVES — An internalized knowledge of how much space the self takes, a spatial relationship developed from body awareness permitting JUDGEMENT OF HEIGHT.

FREE STANDING WALLS — The relationship of objects in space to the self, external spatial relationship which permit the judgement of distance or time in space, TEMPORAL AWARENESS.

FOAM PIT — Motion in space, a dropping and landing, the reflexive movements of body sending kinesthetic information and tactile information via proprioception on a safe and soft landing, BODY AWARENESS, INTERNALIZED.

SLIDES — Movement on the diagonal from up to down, fast movement BODY BALANCE IN MOTION — TEMPORAL AWARENESS in accelerated motion.

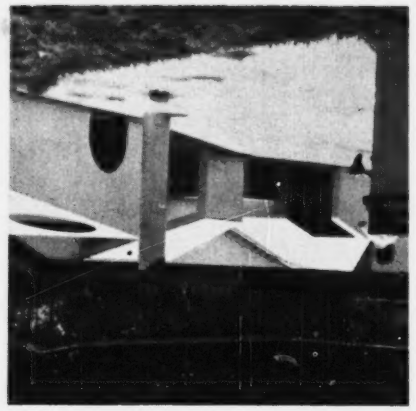
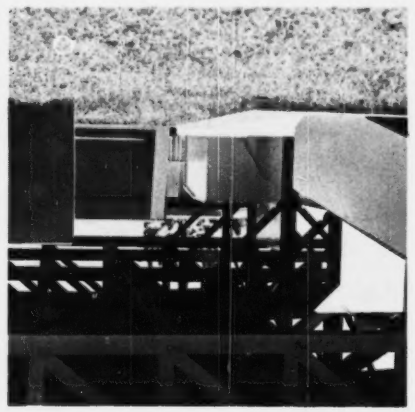
OVERHEAD PULL UP — Movement in near space, grasp and release gravitational pull of body weight upward in space. Information from proprioceptive and reflexible mechanicism giving tactile and kinesthetic awareness also visual integration resulting in JUDGEMENT OF ACCESSIBILITY and INTEGRATION OF THE BODY SIDES.

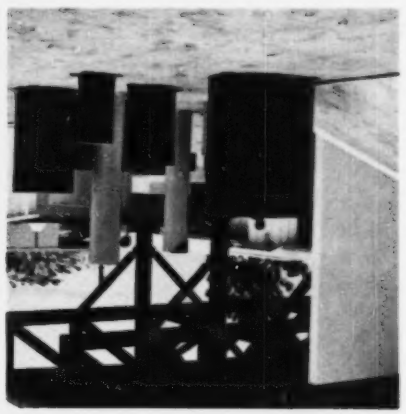
ROLLING HILLS — Motion in space plus rotation of the self, reflexive patterns of arms and legs with tactile and kinesthetic simulation to reinforce body awareness.

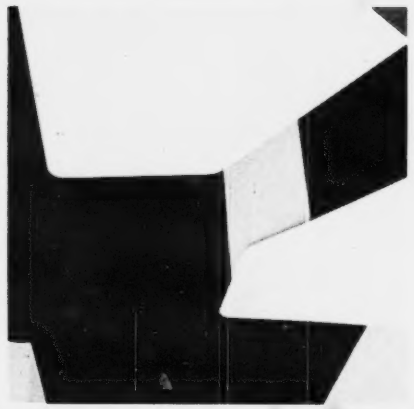
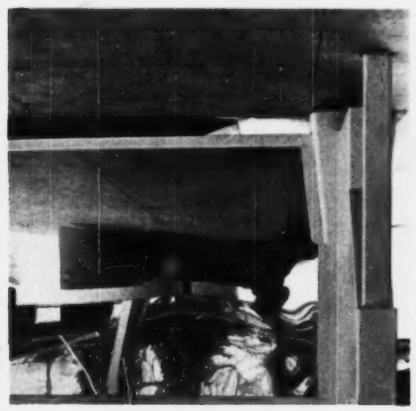
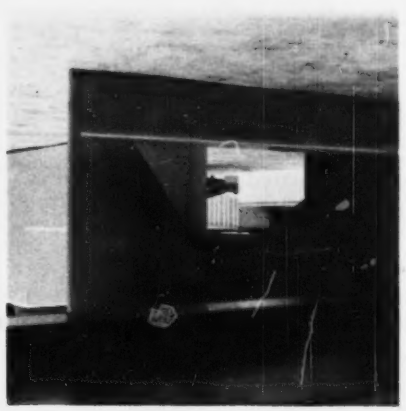
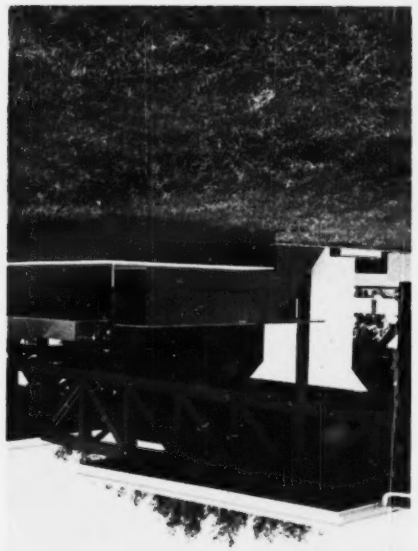
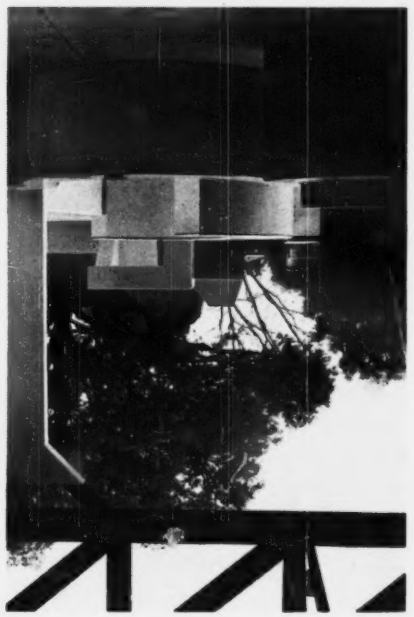
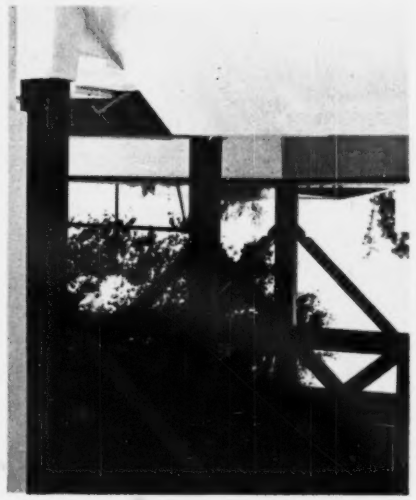
UP AND DOWN RAMPS OF VARIOUS PITCHES — Movement of the body weight up crawling, scooting or climbing up in a prone position, a forward and upness pull against gravity, the kinesthetic and tactile feel of body pull and weight on the mode of BODY AWARENESS AND INTEGRATION OF SIDES.

MIRRORS —Visual images of the body in motion, clues by vision for MOTOR PLANNING.

In September, 1969, the ETC's physical appearance was altered. The expansion of the truss roof structure to cover almost three-fourths more area is the major change. Minor revisions of railings, free standing walls, and falling pit has also been undertaken. These changes represent the spirit of the ETC; an environment which can be changed and altered as needs are made clear, and different goals established.



VI. Testing Plans

The ETC began operation in April, 1969. The long-term goal of the project is to reduce motor perception deficiencies in physically disabled preschool children. The evaluation of the ETC in relation to this goal is just beginning. Extensive testing, for which the grant makes provision, will be used. The first phase of testing has already begun.

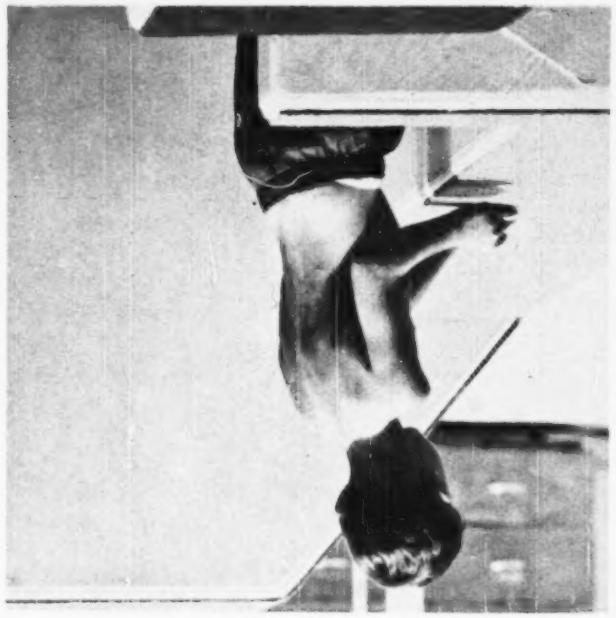
As one aspect of the testing, motion pictures of the children's activities in the ETC are being analyzed by a kinesiologist to determine the nature and degree of muscle strengthening. The environment will be modified if there is any indication of improper muscle balance. Preliminary observations, however, indicate that playground activities are yielding positive results.

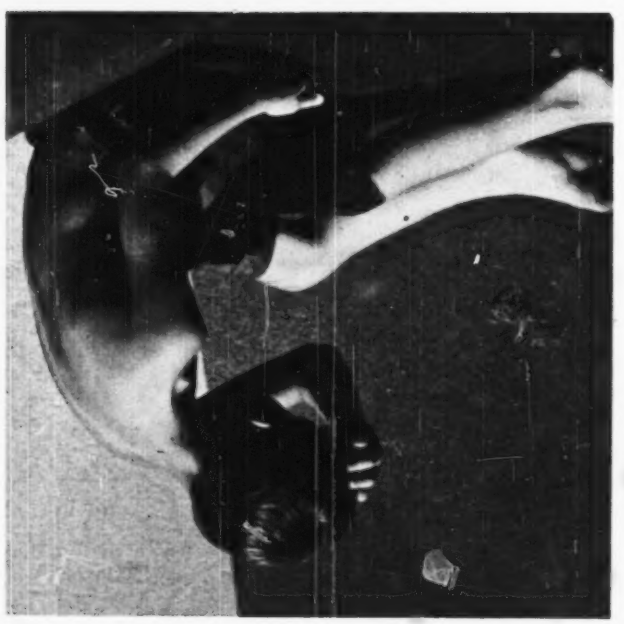
Another aspect of evaluation was initiated immediately before daily use of the ETC began. The playground director administered a basic activity test to each child. Films of these tests will provide a basis for continuing comparison and evaluation of progress as the tests are repeated at regular intervals.

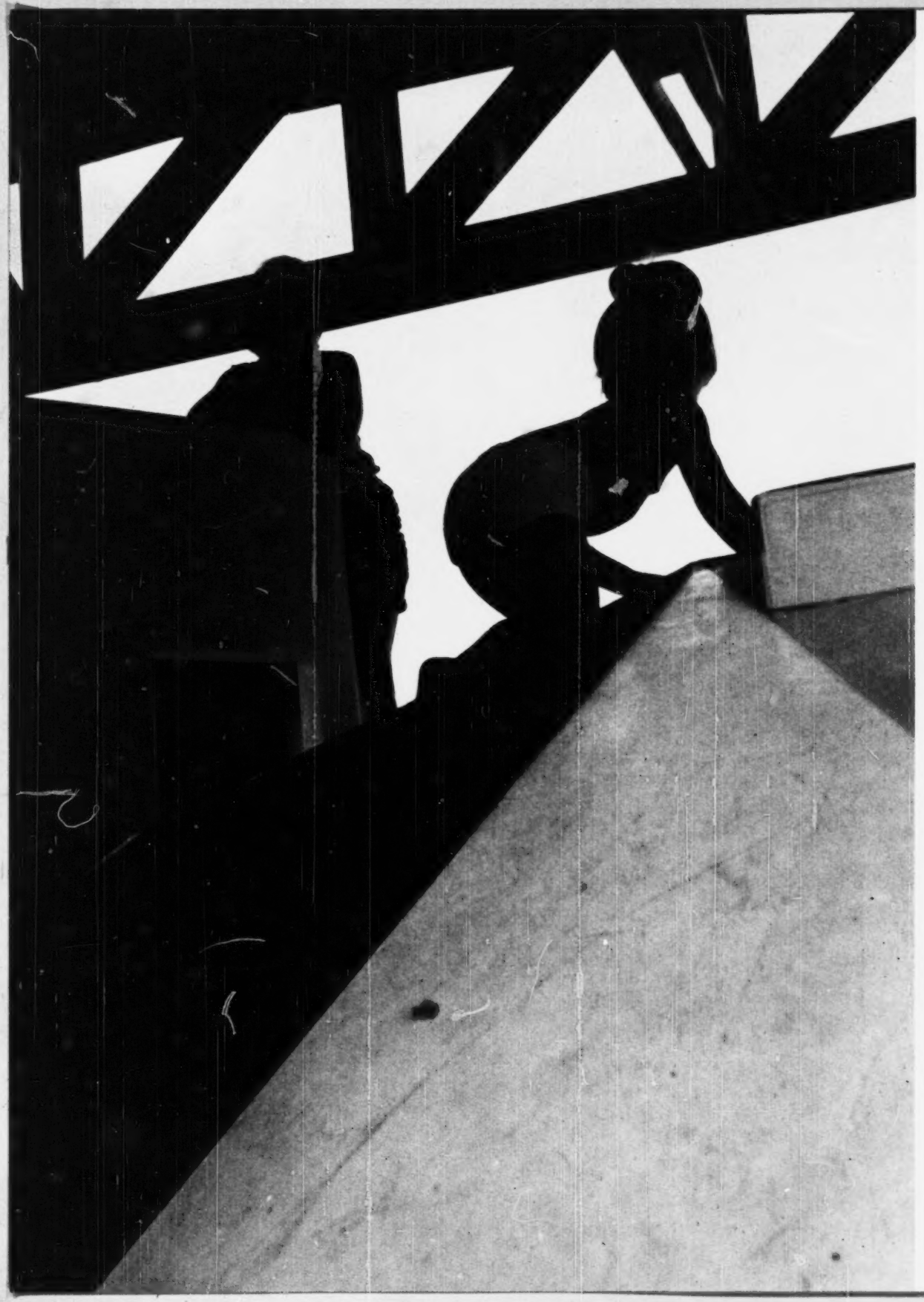
At present there is no motor perception test for disabled preschool children. Such a test is at present being developed; it is based on the fifteen basic perceptual experiences which the ETC is designed to offer. The children will be tested before beginning school activities in the fall. These tests will involve specially designed equipment not a part of the playground. Individual weaknesses will be noted and special play activities will be designed to strengthen them. The test will be readministered during the year to evaluate improvement.

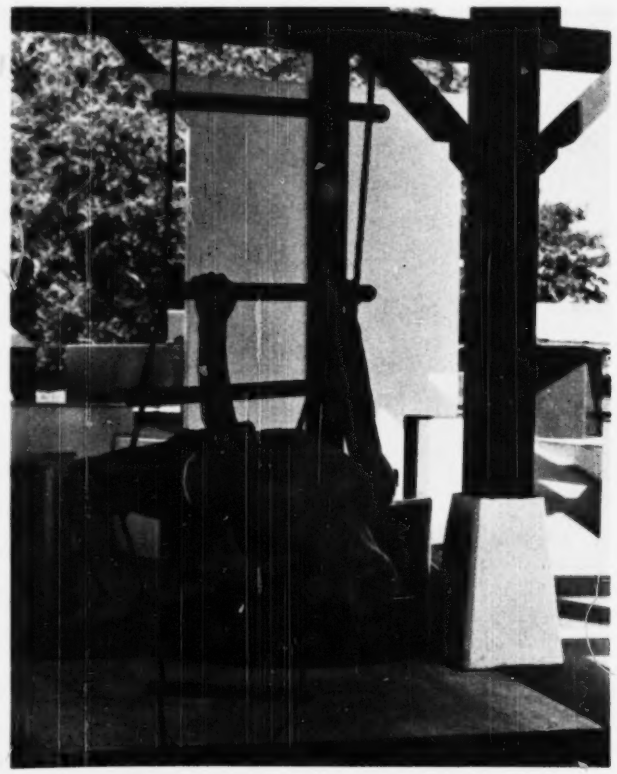
These tests are only a beginning, the ETC offers many possibilities for research. One proposal is to evaluate the effects of color, light, form and shape on perceptual development. The great flexibility of the ETC will lend itself well to experimentation in this area. Colors of panels can be changed, large graphics can be added to surfaces, the scale of some areas can be changed by hanging things from trusses. The children's reactions to such changes can be observed and evaluated. It has also been suggested that the ETC be experimentally used as a classroom to ascertain the effects of the environment on learning.

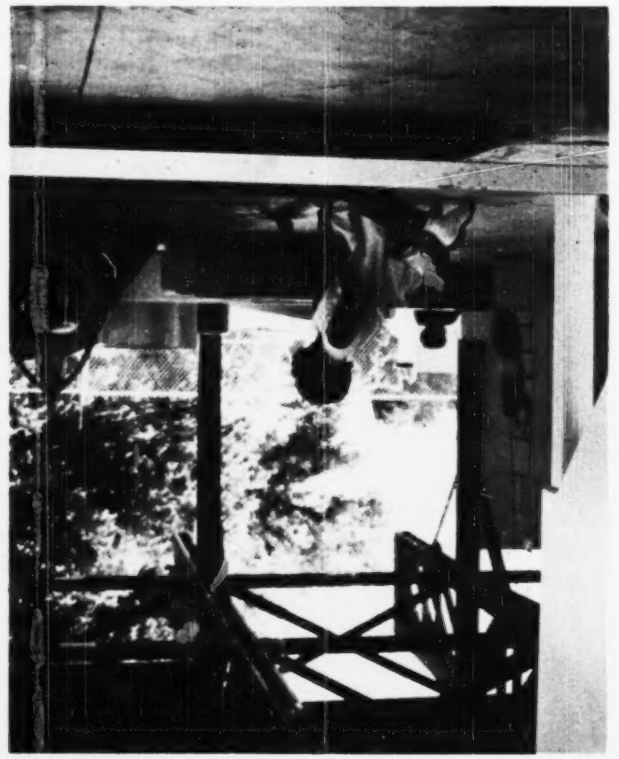
One important test of the effects of the ETC will come as the children who have used it enter first grade. If they have fewer learning problems than similarly disabled children this will be preliminary proof of the positive effects of such play experience.











VII. Early Observations

Although statistical data on the environment's effectiveness is not yet available, informal observations by teachers, therapists and aides indicate exciting results. After being undressed and unbraced, the children are simply told to "go play." No attempt is made to structure their activities; aides and staff are instructed to make no specific suggestions of what to do or where to go. Only minimal supervision is maintained to ensure safety.

The children's reactions to this opportunity for free, unstructured play are truly amazing. A non-ambulatory child reaches out and pulls himself up onto wobbly feet; another even dares to take a few halting steps from one object to another. A belly crawler tries so hard to reach his friends that his knees flex, and suddenly he is crawling on all fours. A child considered unusually weak shows incredible tenacity as she fights her way up a steep slope originally considered negotiable by only the strongest children. A fearful child seeing his friends excitedly flopping into the falling pit finally throws himself into the pit and emerges laughing.

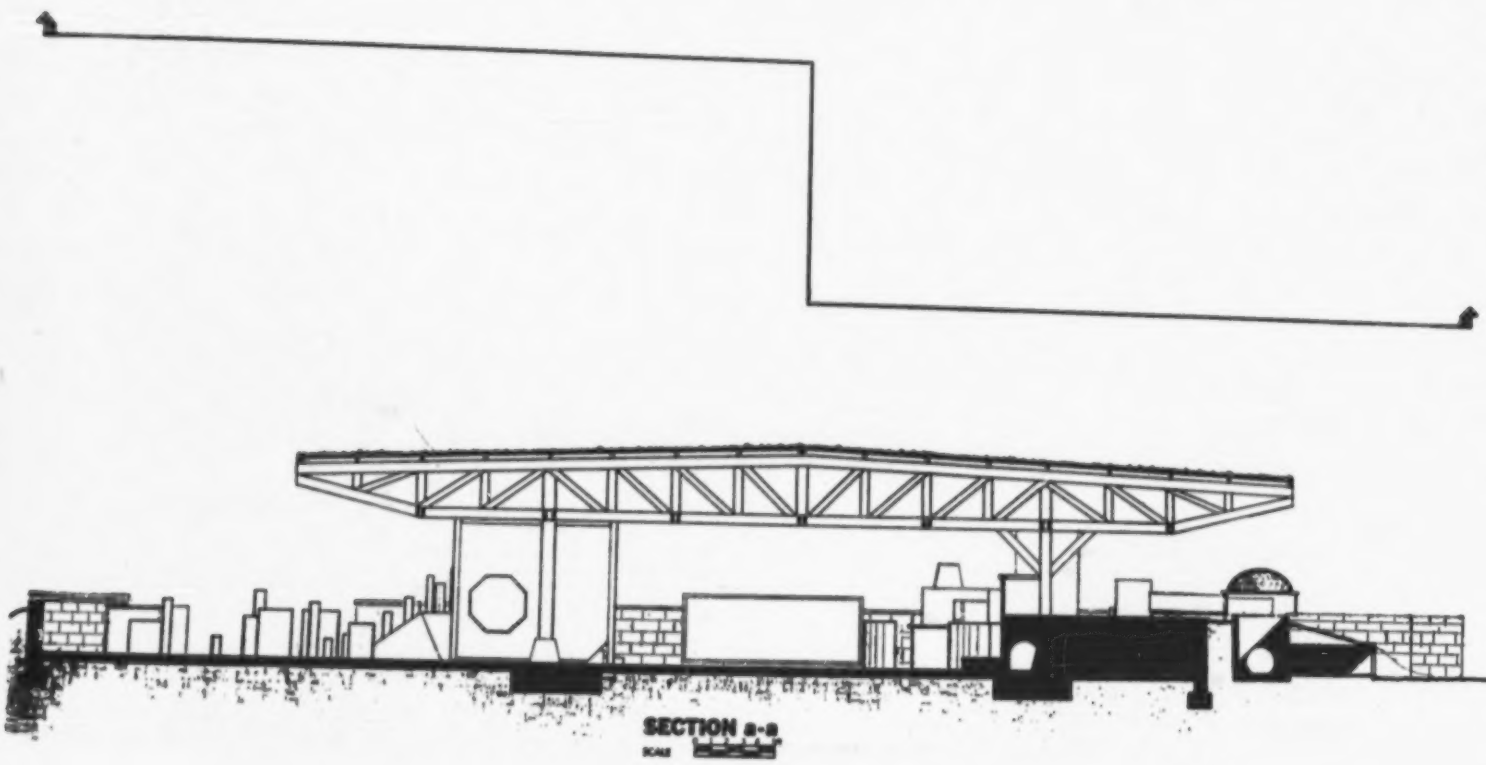
Films of the children at play reveal other startling occurances that might otherwise go undetected. In one instance the film reveals a child, engrossed in play, using a hand previously considered by the therapists to be unusable. Another child is seen extending an arm usually held rigidly against his body.

The personal interaction which occurs on the playground contributes greatly to its effectiveness. Friendships which did not appear in the classroom are forced; groups and leaders emerge. These social ties provide strong motivation for voluntary exercise and exploration. Handicapped children are usually considered unimaginative, yet the games these children invent show immense imagination and creativity that was not evident prior to their exposure to the environment. The falling pit has been a foxhole, a gorge, a fortress, a hiding place. The stump forest has been transformed into a jungle. The desire to be a part of these games often draws a more severely handicapped child into trying things no amount of physical therapy could entice him to attempt.

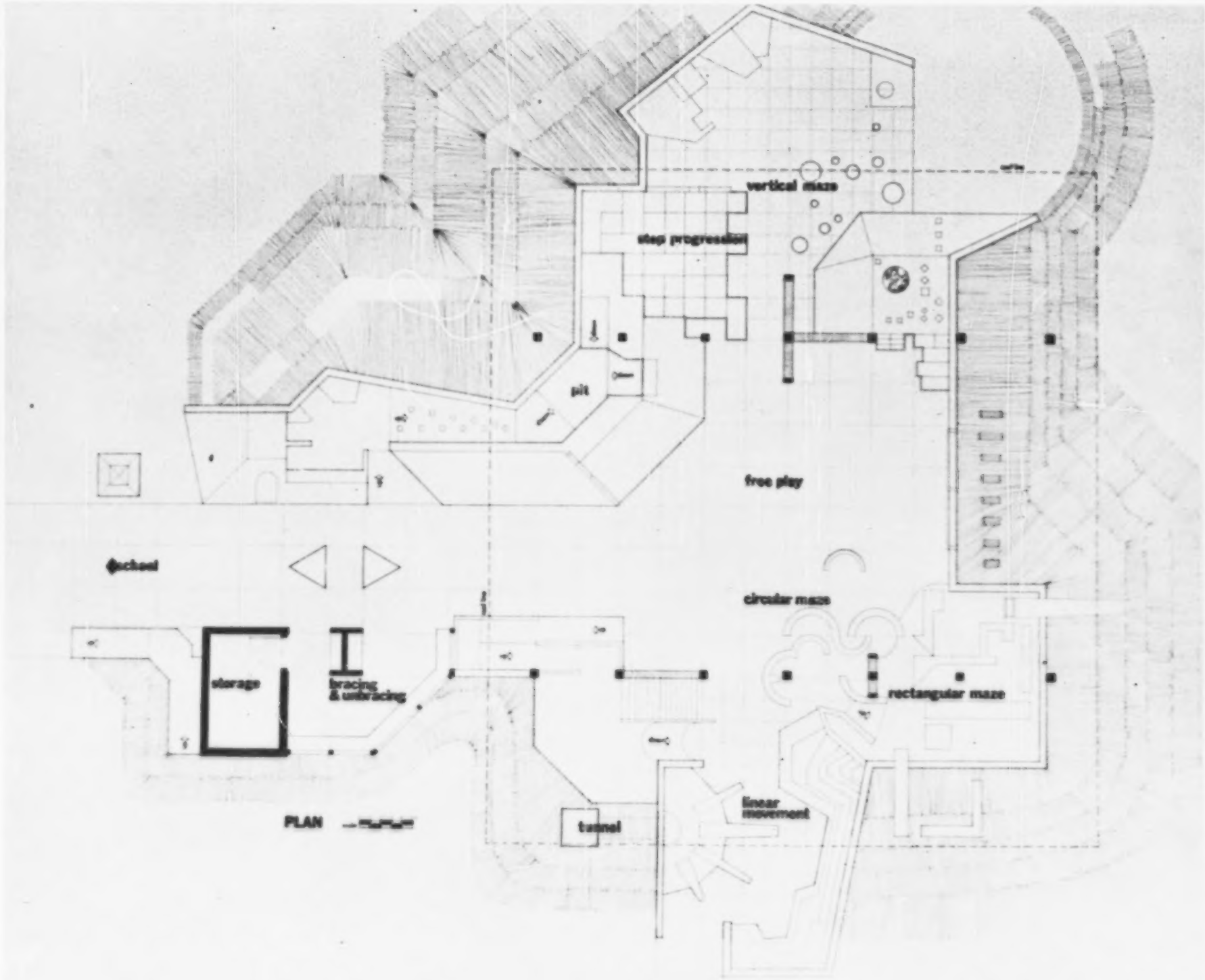
Even if the project were to fail to prove its more difficult and subtle long-term goals, these distinct tangible benefits are undeniable:

1. The children now move actively, rather than passively, through space.
2. Each child achieves self-expression through his own interpretation of the environment.
3. Latent qualities of sociability and leadership are developed through the interaction of the children at play.
4. The self-direction demanded by the environment promotes independence and confidence.
5. The children show a marked increase in sensory awareness, creativity, and response to beauty.

Already these benefits have convinced those involved with this project that it is successful. They feel that such units are vital to the physical and mental growth of all handicapped preschool children.



SECTION a-a


vertical maze
step progression
pit
free play
school
storage
bracing
& unbracing
circular maze
rectangular maze
linear
movement
tunnel
PLAN

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